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ABSTRACT

This study investigated the effect of children's relationships on conversations that took place when children were working on a collaborative writing task, and examined the quality of the writing effort. A total of 62 fourth graders worked under three conditions: (1) individually; (2) with a best friend; and (3) with a nonfriend who was an acquaintance. The students based their stories on story prompts that covered familiar subjects. Results indicated that there were differences in the performances of friends and nonfriends on the collaborative writing task. This indicated that friends were more task-oriented and affirming than nonfriends in collaborative tasks. A sample transcript of a writing collaboration is included. (MM)

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Children's conversations during collaborative writing:
Friends compared with nonfriends

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Abstract

"Children's conversations during collaborative writing: Friends compared with nonfriends" examines the performances of friends and nonfriends on a collaborative writing task. Collaborative writing studies show that children's writing benefits from collaboration. Likewise, friendship studies demonstrate that friends interact more positively and show greater mutuality than nonfriends. This study integrates these earlier friendship and collaborative writing investigations by examining how children's relationships effect the conversations during the composing process as well as the quality of children's collaborative writing. This study contributes to the field of education by providing information that could have an impact on teaching methodologies. Also, this study explores ideas in psychology that friendships are unique relationships which may influence learning and development. This study included a total of 62 4th graders who worked under 3 conditions: 1) individually, 2) with a best friend, and 3) with a non-friend (acquaintance). Each child wrote on a computer a total of 4 stories. The students based their stories on designated story prompts which covered subjects familiar to the students. Interactions recorded during the composing sessions were analyzed and the differences found between friends and nonfriends are discussed.

Introduction

Peer relations and collaborative learning

Children consider the main provisions of relationships with other children to be companionship and common activities (Furman and Buhrmester, 1985). During the past two decades, educators and psychologists have also focused on studies on peer collaboration and cooperative learning in order to better understand the manner in which peer interaction affects children's learning and performance. Theoretically, according to Piaget, (Damon, 1984) peer interaction allows children to gain socially by improving communication and perspective-taking skills and allows for cognitive growth by reexamining beliefs and getting feedback. Similarly, Vygotsky's (Damon, 1984) theory of the zone of proximal development says that working together with more able peers allows a child to enter into new areas of potential. Likewise, in an investigation studying the effects of collaboration in expert/novice pairs, Azmitia (1988) concluded that collaboration helped children master tasks that neither could master alone.

In the area of education, studies have shown that cooperative learning and interaction are often better than both competitive and individualistic learning. In such studies, cooperative learning promoted affective perspective-taking, attitudes toward classroom life, superior cognitive reasoning strategies and higher achievement (Johnson & Johnson, 1976; Skon, Johnson & Johnson, 1978). In a paper advocating cooperative learning in the schools, Damon (1984), argues that collaborative peer interaction helps students learn to communicate through written and spoken language by allowing for free exchange of ideas and reciprocal feedback between mutually respected equals.

Generally then, peer collaboration is seen as good educational technology. Peer collaboration has also been studied in the more specific subject area of children's written narratives. Studies conducted by Daiute, et al., (1986a, 1989, 1990), established that collaboration benefits young writers in several ways. First, the expert/novice relationship appears when one of the children is a more skilled writer. Second, each child brings his or her own skills into the composing session, which allows both collaborators to learn from one another. And, thirdly, in addition to producing more sophisticated stories when collaborating, carry-over effects from the collaborative sessions appear in later individual texts (Daiute, 1986a; Daiute & Dalton, 1989).

Most importantly, Daiute argues that writing involves making sure that one's ideas are expressed clearly and requires the ability to take alternative points of view. In short, writing requires feedback, and collaborative sessions allow for this (Daiute & Dalton, 1988). In these studies, Daiute, et. al analyzed collaborative composing sessions to determine the kinds of talk and interaction between the children who were collaborat-

ing. According to the results, much of the talk between collaborators served a purpose in composing their stories. For example, she found that frequently occurring types of talk such as initiating, contesting and repeating all served important purposes in story production. These types of talk prompted discussion between collaborators, which later transferred into individual writing.

Azmitia (1988) also believes that peer interaction fosters cognitive development by allowing children to acquire new skills and restructure ideas through discussion. In addition to stressing the importance of talk in generating ideas for writing, Daiute argues that play is important. When children play while composing texts, they share experiences which in turn increase literacy. In one instance, Daiute (1989) found that playful elaboration and expansion of one another's text proposal resulted in more elaborate post-collaboration individual writing. She concludes, therefore, that the play demonstrated by coauthors helps in the writing process.

Friendship and peer collaboration

In previous collaborative writing studies, the children were paired according to how well the teachers thought they would function together. In one case, the children were grouped into mixed race pairs, but otherwise matching occurred on the basis of the teacher's cooperative expectations. Researchers did not, however, systematically study the friendship status of the pairs. In fact, few investigations have looked at friendship variables on an academic task such as this. This is a potentially important variable, considering the fact that teachers often do not pair friends on academic tasks, assuming they may not accomplish as much together as mere classmates would.

By definition, friendship involves reciprocity and commitment between two individuals who are considered equals. Friendship formation begins with information exchange and clear, connected communication. Later, children move onto common ground and play activities (Hartup, 1991). According to Hartup and Sancillo (1986), five characteristics mark friendship relationships: 1) friends accept and support one another; 2) enjoy each other; 3) confide in each other and share experiences; 4) trust one another; and 5) have an intimate and mutual understanding of one another. Friendships are often described in terms of positive reinforcement and the amount of mutual satisfaction they give each other (Lott & Lott, 1974, Sullivan 1953). And, a study by Ladd and Emerson (1986) concluded that mutual friends are more aware of each others' personal and social characteristics than nonfriends, resulting in shared knowledge that may aid in perspective-taking.

Several investigations have reported differences in interactions between friends and nonfriends. The study which best exemplifies the friendship characteristics

mentioned above and also shows differences between friends and nonfriends was conducted by Newcomb and Brady (1982). They discovered that, while friends worked together on a novel task, they were more interactive than nonfriends, they smiled and laughed more, and their conversations were more equal and mutually directed than nonfriends. In addition, in later interviews, the children who were paired with their friends remembered more about the task and said they enjoyed it more than did the nonfriends.

In the classroom, the presence of friends also appears to have a positive effect. In a study looking at friends' influence on school adjustment, Ladd (1990) concluded that having friends in the classroom at the beginning of the year predicted better school adjustment. In addition, Berndt and Perry (1986), have found that both grade school and junior high students view their friends as a source of support, with smooth-running friendships promoting positive attitudes toward school.

Several investigators have compared friends with nonfriends in terms of disagreements and conflict resolution. Hartup (1992) has discovered that in "closed-field" situations, (where children must continue to interact), friends disagreed more and had more intense conflicts than nonfriends. In "open-field" situations, however, the opposite was true. In both cases, resolutions of their disagreements were different: friends' conflicts were resolved more equitably and interaction continued more frequently than nonfriends. Similarly, in a study conducted by Nelson and Aboud (1985), researchers observed friends and nonfriends in a conflict situation in which the subjects discussed social problems. Results showed that friends gave more explanations of their positions than did nonfriends. Friend pairs also made more criticisms than nonfriend pairs. Interestingly, friends responded more constructively to conflict, making higher level more mature changes when disagreements did occur.

These findings in the friendship literature lead to the conclusion that there may be general differences between friends and nonfriends in collaborative learning situations. In "Relationships and their significance in cognitive development", Hartup (1985) proposes that friends may facilitate learning from cooperative activity since relationships should contribute to more effective cognitive dialogues than nonfriends. As demonstrated, friends and nonfriends behave differently in terms of knowledge about each other, mutuality, and conflict resolution strategies. From this, one may hypothesize that friends would make better collaborative writing partners, conversing more elaborately, disagreeing and talking with greater mutuality than nonfriends. Since Daiute argues that dialogue and feedback foster childrens' collaborative writing, this particular situation (i.e., collaboration between friends) seems to be especially conducive to studying these differences.

The present study

The design of this study is a replication and extension of Daiute's work on collaborative writing. This study replicates Daiute's studies in that the same basic procedure and design are used. Children will compose stories together on a computer, and their conversations and text will be coded and analyzed. This study expands her study incorporating the friendship variable. Unlike her studies, this study will be focusing on the relationships between the pairs as well as their performances, in order to study the differences between friends and nonfriends.

In this report, we pay closest attention to the dialogue and interactions during the composing process, rather than the stories actually written. We are especially interested in examining friend and nonfriend differences in areas such as mutuality, disagreements, conflict resolution, and play, since these are areas in which friends and nonfriends have differed in the friendship literature. We hypothesize that friends' interactions during composing sessions will differ from nonfriends in these and perhaps other relevant measures.

Methods

Subjects

Sixty fourth-graders participated in the study: 26 girls and 34 boys. The racial composition was 55% white, 33% black and 12% other. All of the children who returned the parent permission slips were allowed to participate, which was over 88%. Of the 26 girls, 4 were assigned to the individual performance condition; 10 were assigned to work with a friend and 12 were assigned to work with a nonfriend. Of the 34 boys, 8 were assigned to the individual performance condition; 12 were assigned to work with a friend and 14 were assigned to work with a nonfriend. The 4 girls and 8 boys who worked alone were used as a control group. Friendship pairs were determined by sociometric evaluation explained in Section Three.

Setting School

The study took place in an inner-city magnet school in St. Paul, Minnesota. Most of the children were from the neighborhood; others, however, attended the school because of its emphasis on math and science. Both the student body and the faculty were of diverse backgrounds. The magnet focused on math and science, and the children were experienced in writing on the computer. All of the sessions took place in the Basic Skills Lab, a resource room for teachers as well as students.

Classes

Three out of five fourth-grade classes in the school were involved in the study. These three classes were chosen because of their willingness to participate and their involvement in a writing curriculum. Two of the teachers had over 15 years of teaching experience and had been at that school for some time. The third teacher had taught at the school for several years. The writing curriculum focused on journal writing and writing about novels. In addition to the stories contained in their fourth-grade readers, the children studied and wrote about several classic novels. In one of the classes, the children had collaborated previously to make a class book.

Sociometric Evaluation

The participating children were given a questionnaire by a graduate student familiar with this type of testing. This evaluator came into the classrooms and asked each participating child to fill out a questionnaire. The questionnaire was designed to determine the friendships within each class, and was divided into three parts. The first part consisted of a list of all children in the class who were the same sex as the child completing the questionnaire, and the child was asked to circle the names of the three children he or she would "most like to play with." The second part required the child to name their best friend in the class. The third part again listed the same sex classmates and asked the child to rank each one on a scale of 1 to 5, 1 being "liked most," and 5 being the "liked least." A final section asked children to list their favorite foods, television programs, sports, etc. to alleviate the sociometrics.

The scoring was done by the sociometric evaluator and Dr. Hartup, the research overseer. Only those children who had 1 or more friends in the class were used to avoid confounding effects. Children were placed randomly into one of three groups: mutual friends, nonfriends, and individuals. As the primary experimenters, we were blind to these assignments in order to avoid biases. Half of the paired children were paired with mutual friends, and half were paired with nonfriends.

Mutual friends were children who: a) listed one another as among their three most liked classmates, and b) rated one another either a "1" or a "2" on the liking scale. Nonfriends were: a) children neither of whom nominated one another as one of the three most liked classmates, but b) whose liking rating ranged between "2" and "4", the neutral range. Assignments to the three experimental groups were counterbalanced within classes and within sex so that their average sociometric status (general liking score) was similar. This counterbalancing assured that the friendship condition was not confounded with sociometric statuses.

Writing Task

Materials and Apparatus

The children wrote their stories on Apple IIc and Apple IIe computers which belonged to the school. The word processing program used was Appleworks. Before working on the computer, the children were instructed to prewrite using markers and large sheets of paper. The experimenters then gave the children the story prompts. Stories focused on the subject of the rain forest, which was a unit that the children had previously studied. Each story prompt contained the situation, and also contained two vocabulary words to incorporate into their stories.

Four story tasks were used with numbers 1 and 2 randomly assigned to the first or last sessions, and 3 and 4 were randomly assigned to the middle 2 sessions. This was done to eliminate the possibility of a task effect. The four story prompts were:

1) Imagine that you were transported to the rain forest. When you get there, you meet someone else from your class. After walking around together all day, you become hungry. No familiar food is in sight. Use the words "planning" and "survive" in your story. 2) Imagine that you were transported to the rain forest. When you get there you see someone else from your class. After walking around, you become lost. Use the words "discover" and "cooperation" in your story. 3) Imagine that you are transported to the rain forest. When you get there you see someone else from your class. You meet many animals, some of them ferocious and some not. Use the words "dangerous" and "habitat" in your story. 4) Imagine that you are transported to the rain forest. When you get there you see someone else from your class. After walking around you discover a group of people burning trees. Use the words "destruction and conservation" in your story. All of the prompts directed the children to: a) write about the event and b) tell why the event was important.

Procedure

Each child wrote a total of 4 stories, taking approximately 25 minutes for each. Children in the individual condition wrote all four stories alone. Children in the collaborating conditions (i.e. either friends or nonfriends) wrote their first story alone, then two stories together, and then the last story alone.

The experimenter brought the children, either alone or together, into the Basic Skills Lab. Experimenters explained to the children that they would be prewriting about a keyword in order to generate ideas. The experimenter let the children read the story prompt and then told them what the keyword was. The keywords used were hungry, lost, animals, and burning, which were the main focuses of each different story. Prewriting involved placing the keyword in a circle in the center of the page and then

writing down ideas about it. The children were instructed to work on this prewriting for 5 minutes.

After prewriting, if it was their first session the subjects were shown how the word processing program worked, because it was slightly different from what they had used previously. The experimenter read the story prompt and instructed the children to write a story on the computer based on the prompt. Both the story prompts and the prewriting sheets were placed near the computer. In the collaborating sessions, the experimenter told the children to work together and contribute ideas, and that they needed to decide who would type first. The experimenter remained in the room, but could not answer any spelling or grammatical questions. After five minutes, the experimenter reminded the children to try to write about what was on the paper, but to be as creative as they wanted. After ten minutes, the experimenters informed the writers that their time was halfway done and told the collaborators to finish their sentences and let their partners type. After they had written for a total of twenty minutes, the experimenters gave the children five minutes to finish up and look over their stories to see if they needed to add or change anything. The collaborative sessions were tape recorded using an audio recorder placed on a shelf or table near the children. After the children were gone the stories were saved on a disk and printed out.

Collaborative Talk Coding and Analyses

Transcriptions

With the help of a paid assistant, one of the experimenters transcribed verbatim the audiotapes from the 48 collaborative composing sessions. Transcripts averaged about 725 utterances, not including the experimenter's responses. An utterance was defined as one speaker's uninterrupted contribution to the conversation.

Coding

The coding procedure consisted of three steps: 1) the development of the codes, 2) coding of the transcripts, and 3) reliability testing.

Development of the Coding System

The goal of the study was to analyze the transcriptions to determine any differences in social exchange between friends and nonfriends. For the purposes of this study, the researchers selected only codes which would best capture the differences between friends and nonfriends were chosen.

The coding system was an adapted version of the coding system used by Daiute in her studies. Daiute's codes can be divided into three classes: topic focus codes,

composing process codes, and social structure codes. Topic focus codes tell what the participants are focusing on in their talk, such as text, tools or personal concerns. Composing process codes refer to general phases of composing, and social structure refers to codes that show the social functions of talk. Extensive consultations with Daiute helped determine codes from her scheme relevant for this study. 35 codes from her list were chosen. In addition, 4 new codes were added which we considered appropriate to friendship. The majority of the codes for this study come from the social structure class. The entire list of codes with explanations is presented in Appendix A.

Coding procedure

The first step in the coding process was to break down each utterance into a t-units. (T-units are utterances which contain a subject and a predicate and can stand alone). Next, after studying Daiute's coding manual and looking at examples of coded transcripts, the coders began to code the transcripts from this experiment. Coders read the transcripts through once to get a feel for the conversation and then proceeded to code. Each utterance was coded with the code which best exemplified what was going on in the talk. Some utterances contained all three focus codes, some contained only one. An example of a coded transcript appears in the Appendix.

Reliability

Each utterance was coded by one of the experimenters and tested for reliability with the help of a research assistant. Reliability for each coding category was determined by dividing the number of agreements between coders by the number of agreements added to disagreements. Each code was tested for reliability separately. Following this process, 12 randomly chosen transcripts were coded by the two individual coders. Disagreements were discussed and a consensus reached.

Results

Owing to time constraints, the data reported in this section represent only a small sample of the total data. The first collaborative stories for each of 22 pairs were coded and analyzed, and the results which have relevance for friendship research appear in this section. Conversations of the friends and the nonfriends were compared in two ways: frequency scores and the ratio (proportion) of these frequencies to the total number of utterances computed separately for each pair.

Mutual Orientations

Six codes which reflected some type of mutuality rather than individuality were examined in this category. Table 1 shows the overall frequency of each code individually, clustered into two groups and summed over the entire six codes. The variability was high, and no significant differences were found.

Insert Table 1 about here

Table 2 shows proportions of the mutually-oriented codes. When looking at the occurrences in proportion to utterances, significant differences were found between friends and nonfriends. A borderline level of significance ($.05 < p < .10$) was found for affirmations, (AFF), suggesting friends used these verbalizations to a greater extent than nonfriends. Friends were also more likely to use mutuality (MUT) in reference to the task and the story. The level of significance was $.05 < p < .10$. Combined, affirmations and mutuality showed significant differences beyond the .01 level, with friends showing a more mutual orientation than nonfriends. Finally, a summary score of all mutually oriented codes showed a $p < .05$ level of significance.

Insert Table 2 about here

Disagreements and Alternatives

No significant differences were found for friends and nonfriends in this coding category. Although the conversations of friends showed more disagreements (DIS) and posing of alternatives (ALT), both in frequency and proportions, there were no significant differences. The nonfriends contested (COT) slightly more than the friends, with small variability, but the difference was not significant. Results for both frequencies and proportions can be found in Table 3.

Insert Table 3 about here

Other Measures

Table 4 focuses on two measures relevant to friendship study: off task and play. Nonfriends engaged in off-task talk more than friends. When looking at the frequency alone, this difference was not significant. Proportionally, however, the differences reached the $p < .01$ level. There were no differences in the frequency and proportion of play between the two groups.

Insert Table 4 about here

Length of Utterances

When comparing friends and nonfriends overall for length of utterances, the mean for friends was ($M = 748.4$) and for nonfriends the mean was ($M = 709.4$). There were no significant differences in this measure.

Mean number of utterances for friends and nonfriends were computed separately by sex. The mean for girls was ($M = 856.8$) for friend pairs compared with ($M = 921.6$) for nonfriends. The mean number of utterances for boys in both conditions was much lower: ($M = 613$) for friends and ($M = 527.9$) for nonfriends. Overall, girls' utterances ($m = 892$) were longer than boys' ($M = 559$), and of borderline significance: $t = 1.86$; and $.05 < p < .10$.

The results for girls and boys varied in direction as well. For girls, nonfriends talked more ($M = 921.6$), and for boys, friends talked more ($M = 613$). When the mean number of utterances from above are compared separately by sex, no significant differences were found.

Discussion

According to these preliminary analysis, it appears that there were differences on some of the measures between friends and nonfriends. In this section, I will discuss these differences, compare them with previous investigations, discuss implications and enumerate directions for further study.

Mutual Orientations

The most significant differences between friends and nonfriends occurred in terms of their mutual orientations. Several examples from previous friendship investigations could explain why this happened. The fact that friends affirmed each other more often is similar to one of the basic tenets of friendship stated by Hartup and Sancillo (1986). They concluded that friends accept and support one another more than nonfriends. When one of the partners affirms what the other partner suggests or states, he or she is accepting the

partner's ideas, at the same time supporting them. Since friends have been shown to do this in other problem solving situations, it is logical that in the collaborative conversations they would make more affirmations.

The greater number of occurrences of the mutuality measure also demonstrated that friends are more mutually-oriented toward one another than nonfriends. This measure reflected how friends used mutual pronouns more often in the conversations about the text and general task. These findings support the investigations of Newcomb and Brady (1982), who found that the conversations of friends were more mutually directed.

When combining affirmations and mutuality with all of the other measures in this category, the friends once again proved to be more mutually-oriented than the nonfriends. Other measures included clarification, elaboration, informing, and repetition. By elaborating on previous ideas more often than nonfriends, friends once again showed their acceptance and support of their partner's ideas. Clarifying and repeating served the function of making sure they were getting these ideas right. Finally, friends informed their partners of their intentions more. Inform also included giving explanations, which agrees with Nelson and Aboud's (1985) findings that friends give more explanations of their opinions than nonfriends. Although these measures did not separately distinguish between the conversations of friends and nonfriends, the overall pattern suggests that friends operate in a "climate of agreement" (Gottman, 1983).

Disagreements and Posing of Alternatives

Although the occurrences in this category did not differ significantly for friends and nonfriends, it is important to mention some of the slight differences. First, the friends disagreed more often than the nonfriends. One could argue that disagreements are detrimental to collaborative writing, however, in this instance they may have actually been beneficial. These disagreements promoted discussions, and often resulted in a change in the story. The differences in disagreements between friends and nonfriends are consistent with Hartup's (1985) conflict studies in that the friends disagreed more in "closed-field" situations. In addition, the friends posed more alternatives than the nonfriends, a finding that is consistent with studies by Nelson and Aboud (1985) which showed that friends responded more constructively to criticism and made more mature higher level changes. The greater number of alternatives posed by friends are also evidence of this. Taken together, the trends in these analysis suggest further exploration of disagreements using the data set for the second collaborative stories in addition to the first ones.

Other Measures

Other measures, such as play, off-task talk, and length of utterances were analyzed because of their relevance to friendship. Since play did not differ significantly between friends and nonfriends, I cannot argue that it benefited either group more or less. Play did occur, however, and in ways that were similar to its occurrence in Daiute's studies. Play served the function of generating ideas and elaborating on them. According to Newcomb and Brady (1982), friends should have played more, but this was not the case. It would be interesting to study how the kinds of play differed between groups. Some play centered around the text, for example making up a funny rhyme about a particular word chosen. Other types of play were more related to off-task, such as teasing or telling jokes. Once again, analysis of the conversations that occurred during the the composition of the second stories should be revealing.

Off-task talk was significantly higher between nonfriends than between friends. This contradicts some teachers' beliefs that friends would engage in more off-task conversations than nonfriends. I have two explanations to explain why off-task may have occurred more in nonfriend pairs. First, explanations about friendship formation may relate to off-task conversations. According to Hartup (1991), relationships start with information exchange and move to common ground activities. Perhaps the off-task talk between nonfriends was actually the beginnings of a relationship. In order to work together well, they may have decided to exchange some personal information and establish some commonality.

The second possible explanation for more off-task talk among nonfriends is the fact that a pair may have had no interest in collaborating on the task and therefore resorted to off task conversations. It is important to keep in mind that one of the partners often would engage in off-task talk, while the other partner completed the task. In these cases, there was an imbalance in the commitment to the task. From this perspective, I could argue that the friends felt it was more important to stick to the task than nonfriends.

In terms of length, there were no significant differences between friends and nonfriends. The friends talked slightly more than the nonfriends, which is consistent with Newcomb and Brady's (1982) findings that friends interact more. But, given the small sample size and extreme variability in this measure, this difference did not emerge here. Interestingly, when comparing boys and girls separately there were some sex differences in terms of who interacted more, the friends or the nonfriends.

Sex Differences

Although this study did not systematically take sex differences into account, it is

important to mention some of the important differences. On some of the measures such as length, between group differences went in opposite directions for boys and girls. In addition, the boys in both groups tended to play more. Likewise, the difference in off-task talk between friends and nonfriends resulted mainly from boys' conversations. Although the sample size is small, it is necessary to examine more closely the sex differences.

Future of the Study and Suggestions for Further Studies

Future plans for the study include analyzing the data from the second collaborative sessions. It will be interesting to see how the pairs differed on their second session together, both in comparison to the first session conversations and in combination with them. These results could prove especially interesting in the case of the nonfriends, since they may be more acquainted with one another. The entire list of codes will be analyzed as well. Given the trends of the preliminary analysis, codes such as self-repetition, content, mechanics and interpersonal affect may be revealing. The data from the collaborative composing sessions will be combined with text data to compare how the stories and the production of the stories interact and differ for friends and nonfriends.

In replications of this study, I would suggest separating the sexes to control for sex differences. I would also suggest a post-collaboration interview for the children to see how they liked working with a friend or a nonfriend. It would be interesting to see if any friendships developed, and who they would choose to work with in the future.

Conclusions

In this study, differences were found in performances of friends and nonfriends on a collaborative writing task, mainly in the extent to which the conversations were task-oriented and mutually-reinforced. The results were consistent with the previous friendship investigations. For psychologists, this study has reinforced beliefs about differences between friends and nonfriends, especially in the sense that mere relationships encompass affirming, reciprocal behavior exchanges. For educators, it is interesting for them to see that friends may work more productively than previously thought. Rather than distracting one another in collaboration tasks, friends actually are more task-oriented and affirming than nonfriends.

Table 1. Mean mutually-oriented frequency scores, standard deviations and t-tests for conversations between friends and nonfriends.

	Pairs					
	Friends			Nonfriends		
	\bar{x}	SD	\bar{x}	SD	t	significance level
Measures						
A) Individual Measures	19.3	14.6	11.1	8	1.74	
Affirmation	7.2	6.8	3.8	3.3	1.57	n.s.
Clarification	14	8.3	14.1	11.6	.022	n.s.
Elaboration	8.1	8.1	5.5	4.2	1.04	n.s.
Inform	15.5	12.9	12.3	8.4	.711	n.s.
Mutuality	21.7	19.3	14.8	16	.932	n.s.
Repetition						
B) Cluster Measures						
Affirmation Mutuality	34.9	26.6	23.6	15.5	1.26	n.s.
Clarification Elaboration Inform Repetition	52.2	39.8	38.5	28.2	.951	n.s.
C) Summary Score						
Cluster measures added	93.9	5.5	61.9	38.8	1.65	n.s.

Table 2. Mean mutually-oriented proportion scores, standard deviations and t-tests for conversations between friends and nonfriends.

Measures	Pairs				t	significance level
	Friends		Nonfriends			
	\bar{x}	SD	\bar{x}	SD		
A) Individual Measures						
Affirmation	2.3	1.0	1.5	.67	1.98	$p < .10$
Clarification	.97	.77	.66	.67	1.01	n.s.
Elaboration	3.0	4.2	2.0	1.6	.794	n.s.
Inform	.83	.6	.71	.42	.558	n.s.
Mutuality	2.5	1.3	1.5	.94	2.11	$p < .05$
Repetition	2.8	1.3	1.9	1.6	1.55	n.s.
B) Cluster Measures						
Affirmation						
Mutuality	34.9	1.9	3.1	.87	3.03	$p < .01$
Clarification						
Elaboration						
Inform						
Repetition	7.1	4.5	5.3	2.9	1.15	n.s.
C) Summary Score						
Cluster measures added	12.6	4.7	8.4	3.2	2.51	$p < .05$

Table 3. Mean disagreement and alternative frequency and proportion scores, standard deviations and t-tests for conversations between friends and nonfriends.

Measures	Pairs					
	Friends			Nonfriends		
	\bar{x}	SD	\bar{x}	SD	t	significance level
A) Individual Measures Alternatives						
Frequency	11.4	8.5	7.7	6.3	1.19	n.s.
Proportion	1.3	.66	1	.78	.943	n.s.
Contesting						
Frequency	5.4	3.8	5.5	3.7	.063	n.s.
Proportion	.85	.42	.91	.72	.226	n.s.
Disagreements						
Frequency	8.5	7.8	5.6	4.9	.824	n.s.
Proportion	1.12	.47	.82	.62	.110	n.s.
B) Cluster Measures Alternatives Disagreements						
Frequency	20	15.3	13.3	10.2	1.26	n.s.
Proportion	2.3	.72	.19	1.2	.895	n.s.
C) Summary Score Cluster measures added						
Frequency	25.4	18	18.8	13.1	1.11	n.s.
Proportion	3	.77	2.8	1.6	.348	n.s.

Table 4. Mean miscellaneous frequency and proportion scores, standard deviations and t-tests for conversations between friends and nonfriends.

Measures	Pairs				t	significance level
	Friends		Nonfriends			
	\bar{x}	SD	\bar{x}	SD		
Play						
Frequency	14.5	10.4	10.2	9.3	.005	n.s.
Proportion	2.2	2.0	2.16	2.6	.039	n.s.
Off-Task Talk						
Frequency	.88	1.4	9.1	16	1.24	n.s.
Proportion	.06	.11	1.4	1.5	2.66	<u>p</u> <.05
Length of Z Utterances						
	784.4	598	709.4	481	.192	n.s.

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Appendix A:
Relevant transcription codes to study friendship effects.

Topic Focus Codes (%tfc)

NAM	Use of names	(in text)
PER	Personal issues	(relates to story, ex: "I'm tired.")
PRO	Procedures	(use of keyboard, equipment)
COM	Composing process	(writing, doing, editing, erasing)
EMO	Emotion	(use of emotion words in text)
DES	Description	(use of adjectives in text)
TAR	Target words	(use of target words)
OFF	Off task	(ex: "When's your birthday")
CON	Content and meaning, includes:	
	content	(adding new ideas)
	sense	("does this make sense")
	importance of story	("tell why it is important")
	rhetical question	
STR	Structural, includes:	
	sentence	
	length	
	organization	
	paragraphing	
	salutation	
	ending	
MEC	Phrasing and mechanics, includes:	
	style/phrasing	(let's say it better)
	capitalization	
	punctuation	
	spelling	
	spacing	

Composing Process Codes (%cpc)

RES	Resource check	(eliciting help of experimenter)
REA	Reading	(reading story aloud)

Social Structure Codes (%ssc)

Mutual Orientations *

AFF	Affirming	(yes, ok)
ANS	Answering	(answering a question)
CLA	Clarification	(use of words like "what")
CMT	Comment	(comment on a previous suggestion)
DIR:sof		("soft" direction, "let's say")
ELA	Elaboration	(elaborate on previous suggestion)
INF	Inform/Explain	(inform or explain one's intentions)
MUT	Mutuality	(use of mutual pronouns)
REP	Repeat	(repetition of what other says)
NAM	Name	(use of other's name)
PLA	Playing	(joking, laughing, whispering)

Individual Orientations*

DIR	Direction	("put that there")
ELI	Elicitation	(elicit response from other)
INI	Initiate	(initiate new element)
INS	Instruct	(give instruction as a teacher)
PEV	Positive eval.	(of other, or PEV:own of self)
NEV	Negative eval.	(of other, or NEV:own of self)
REP:own	Repeat own	(repeat self)
INT	Individual pronoun use in reference to text	
INP	Individual pronoun use in reference to person	

Disagreements*

DIS	Disagree	(use when word "NO" occurs)
ALT	Alternative	(posing an alternative)
COT	Contesting	(contest spelling, word choice)

COR Correcting (use when an idea is way off)

Other*

LOV Interpersonal/affect (use of "you", words such as
love, like, want)

LUP Leaped uptake (mentioning something much later)

KNO Know (explicitly says know/don't know)

GEM Gem (something very rare or advanced)

*Codes do not necessarily fit into these categories. Should be
viewed along a continuum from most to least mutually oriented.

Appendix B: Sample Coded Transcript

@Begin

@Participants: EME Emelia subject, SHE Shemeeka subject
BOT Both WEN Wendy Researcher

@Age of EME: 10:1.2

@Age of SHE: 10:5.7

@Birth of EME: 1-Jan-1982

@Birth of SHE: 11-Nov-1981

@Educ of EME: 4

@Educ of SHE: 4

@Filename: TBC1AB2

@Sex of EME: F

@Sex of SHE: F

@Date: 16-Mar-1992

@Location: St. Paul, Minnesota, USA

*EME: Ok.
%ssc: \$AFF
*SHE: One day.
%tfc: \$CON
%ssc: \$INI
*EME: One day, I.
%ssc: \$REP \$ELA \$INT
*SHE: Yeah.
%ssc: \$AFF
*EME: I.
%ssc: \$REP:own
*SHE: Wait.
%ssc: \$DIR
*SHE: Wait a second.
%ssc: \$REP:own \$ELA
*EME: Oh [laugh].
%ssc: \$LAU
*SHE: Space it, space.
%tfc: \$MEC
%ssc: \$DIR \$REP:own
*EME: forest.
%tfc: \$CON
%ssc: \$INI
*SHE: In the forest.
%ssc: \$ELA \$REP
*EME: In the forest.
%ssc: \$REP
*SHE: In the forest.
%ssc: \$REP
*EME: And it was.
%ssc: \$ELA
*SHE: was.
%ssc: \$REP
*EME: walking.
%ssc: \$ELA
*SHE: It was, Emmie.
%ssc: \$REP \$NAM

*EME: No.
 %ssc: \$DIS
 *EME: No.
 %ssc: \$REP:own
 *SHE: Yes.
 %ssc: \$COT
 *SHE: Yes.
 %ssc: \$REP:own
 *EME: It was.
 %ssc: \$REP
 *SHE: UM@.
 %tfc: \$UNC
 *EME: It was # people.
 %ssc: \$REP:own \$ELA
 *SHE: People.
 %ssc: \$REP
 *EME: His friends, period.
 %tfc: \$MEC
 %ssc: \$ALT
 *SHE: His brothers and sisters, his family. In your
 report write, use the word dangerous. Walking
 and saw a.
 %tfc: \$CON \$STAR \$COM
 %ssc: \$REP \$ELA \$ALT \$INI
 *EME: XX No. [laugh].
 %ssc: \$DIS \$LAU
 *SHE: XX.
 %tfc: \$UNC
 *EME: Oh, so then he.
 %ssc: \$ELA
 *SHE: He was alone by himself.
 %tfc: \$CON
 %ssc: \$INI
 *EME: Saw a, saw a.
 %ssc: \$ELA \$REP:own
 *SHE: And he became scared.
 %tfc: \$EMO \$CON
 %ssc: \$INI
 *EME: How do you spell dangerous?
 %tfc: \$MEC \$STAR
 %ssc: \$ELI \$LOV \$REP \$ALT
 *SHE: No, one day a fox was in the forest.
 %cpc: \$REA
 %ssc: \$DIS
 *SHE: And it was walking by itself.
 %cpc: \$REA
 *SHE: Because people killed his family.
 %cpc: \$REA
 *SHE: Then he saw us and became dangerous.
 %cpc: \$REA
 *SHE: How does he become dangerous?
 %tfc: \$CON \$STAR
 %ssc: \$ELI
 *EME: He wasn't dangerous because.

%ssc: \$INF
 *SHE: Say dangerous.
 %tfc: \$COM \$STAR
 %ssc: \$DIR
 *SHE: And then say why he was dangerous.
 %tfc: \$CON \$COM \$STAR
 %ssc: \$DIR
 *EME: Because, because he thought, because he thought
 0 deers.
 %tfc: \$CON \$INI
 %ssc: \$ELA \$REP \$REP:own \$REP:own
 *SHE: Deers H#A.
 %tfc: \$MEC
 %ssc: \$REP
 *EME: H#A.
 %ssc: \$REP
 *SHE: I#T#A#T.
 %tfc: \$MEC
 *EME: We walked on and saw a deer's habitat and.
 %tfc: \$CON \$STAR
 %ssc: \$INI \$MUT
 *SHE: It was ruined when # when the hunters, the hunters.
 %tfc: \$DES \$CON
 %ssc: \$INI \$REP:own
 *EME: It was ruined when.
 %ssc: \$REP
 *SHE: I told you, came.
 %ssc: \$INF \$LOV \$ELA
 *EME: When the hunters came.
 %ssc: \$REP
 *SHE: The. His family killed the.
 %tfc: \$CON
 %ssc: \$INI
 *EME: The deer and foxes. The deer's habitat, and the
 hunters killed the, killed the fox's family, no,
 deers.
 %ssc: \$ELA \$ALT \$REP:own \$REP:own \$DIS
 *EME: The hunters killed the fox's family.
 %ssc: \$REP:own
 *SHE: Family [laugh].
 %ssc: \$REP \$LAU
 *EME: Family.
 %ssc: \$REP
 *WEN: Emmie can finish with that idea and then you can
 switch and Shemeeka can type, ok.
 *SHE: Yes .
 %cpc: \$RES
 *EME: Oh, it's bigger.
 %tfc: \$PRO
 %ssc: \$CMT
 *SHE: Ok.
 %ssc: \$AFF
 *BOT: [whispers].
 %ssc: \$WHI

*EME: When we saw.
 %tfc: \$CON
 %ssc: \$INI \$MUT
 *SHE: The, the.
 %ssc: \$ELA \$REP:own
 *EME: We decided, we decided to fix, fix it up so deer.
 %tfc: \$CON
 %ssc: \$INI \$MUT \$REP:own
 *SHE: deer.
 %ssc: \$REP
 *EME: would.
 %ssc: \$ELA
 *SHE: No, wait.
 %ssc: \$DIS \$DIR
 *EME: Would come back to the, to their, put I, home.
 %tfc: \$COM \$MEC
 %ssc: \$ELA \$DIR \$REP \$REP:own \$ALT
 *SHE: In the rainforest.
 %tfc: \$CON
 %ssc: \$ELA
 *EME: Capital R, return. Put we.
 %tfc: \$COM \$MEC \$MEC \$CON
 %ssc: \$MUT \$DIR \$INI
 *SHE: We.
 %ssc: \$REP
 *EME: We walked for a while, for a while. W#E. We.
 %tfc: \$MEC
 %ssc: \$ELA \$REP \$REP:own
 *SHE: Across a.
 %ssc: \$ELA
 *EME: Family.
 %ssc: \$ELA
 *SHE: Of.
 %ssc: \$ELA
 *EME: Of, no.
 %ssc: \$REP \$DIS
 *SHE: What did you do?
 %ssc: \$CLA \$LOV
 *EME: They, E#Y.
 %tfc: \$MEC \$CON
 %ssc: \$INI
 *SHE: They, oh, [laugh], A.
 %tfc: \$MEC
 %ssc: \$REP \$LAU
 *EME: Shemeeka, no. Not an A.
 %tfc: \$MEC
 %ssc: \$DIS \$COT \$NAM
 *SHE: Oh.
 %ssc: \$CMT
 *EME: There's no A, just E#Y, period. Were looking,
 were looking at us.
 %tfc: \$MEC
 %ssc: \$ELA \$INS \$MUT
 *SHE: Us.

%ssc: \$REP
 *EME: In, let's see.
 %ssc: \$ELA \$MUT \$DIR:sof
 *SHE: Yes?
 %ssc: \$ELI
 *EME: At it, us U, period.
 %tfc: \$MEC
 %esc: \$REP:own \$ALT
 *SHE: No.
 %ssc: \$DIS
 *SHE: No.
 %ssc: \$REP:own
 *EME: Us, and they, wait.
 %ssc: \$REP:own \$ELA \$DIR
 *EME: wait.
 %ssc: \$REP:own
 *SHE: Us, no, stop.
 %ssc: \$REP \$DIS \$DIR
 *EME: That, just a minute, that, in a way that.
 %ssc: \$DIR \$ELA \$REP:own \$ELA
 *WEN: Shemeeka and Emmy, you guys have about five
 more minutes.
 *EME: We never, never saw. A A.
 %tfc: \$MEC
 %ssc: \$MUT \$ELA \$REP:own
 *SHE: No, oop@.
 %ssc: \$DIS \$CMT
 *EME: A.
 %ssc: \$REP:own
 *SHE: Saw before.
 %ssc: \$ELA \$REP
 *EME: Before, before, yep.
 %ssc: \$REP \$AFF \$REP:own
 *SHE: Ok, we gotta XX.
 %ssc: \$MUT \$AFF \$DIR
 *EME: What? One day a fox was walking in the forest.
 %cpc: \$REA
 %ssc: \$CLA
 *BOT: And it was walking by itself.
 %cpc: \$REA
 *BOT: Because people killed his family.
 %cpc: \$REA
 *BOT: So when he saw us he became dangerous.
 %cpc: \$REA
 *BOT: Because he thought we were mean people.
 %cpc: \$REA
 *BOT: We walked on and saw a deer's habitat.
 %cpc: \$REA
 *BOT: It was ruined. When the hunters killed
 the foxes family we.
 %cpc: \$REA
 *WEN: You guys can try to finish your story and look
 over it to see if there's anything you need to
 change, ok.

*SHE: Ok.
 %cpc: \$REA
 *EME: We went.
 %ssc: \$MUT \$ELA
 *SHE: Ooh, ooh@.
 %tfc: \$UNC
 *EME: Family, they were, I.
 %tfc: \$MEC
 %ssc: \$REP
 *SHE: They saw.
 %ssc: \$ALT \$REP:own
 *EME: Saw the.
 %ssc: \$ELA \$REP
 *SHE: Saw the habitat, habitat and.
 %cpc: \$REA
 *EME: It.
 %ssc: \$ELA
 *SHE: It.
 %ssc: \$REP
 *EME: too.
 %ssc: \$ELA
 *SHE: Too. When we saw the.
 %cpc: \$REA
 *BOT: Habitat we decided to fix it up so.
 %cpc: \$REA
 *BOT: deers could come back to their home in the
 rainforest.
 %cpc: \$REA
 *BOT: After we walked for a while we came across
 a family of monkeys.
 %cpc: \$REA
 *BOT: They were looking at us in a way that we
 never saw before.
 %cpc: \$REA
 *EME: I forgot to put something. before.
 %tfc: \$COM \$CON
 %ssc: \$INF \$INI
 *SHE: And they.
 %ssc: \$ELA
 *EME: You XX?
 %ssc: \$ELI \$LOV
 *SHE: They started to.
 %ssc: \$ELA \$REP:own
 *EME: Ah, jump?
 %ssc: \$ELA \$ELI
 *WEN: You can finish the thought and then look it over
 and see if you need to fix or change anything.
 *EME: That's not the thought.
 %ssc: \$CMT
 *SHE: That's funny? [laugh] Ok.
 %ssc: \$ELI \$LAU \$AFF
 *EME: Nothing needs a change.
 %tfc: \$STR
 *SHE: [singing] "I knew nothing need a change."

%tfc: \$STR
 %ssc: \$PLA
 *SHE: I think we're almost finished.
 %tfc: \$STR
 %ssc: \$MUT \$INP
 *EME: I think we're finished already.
 %tfc: \$STR
 %ssc: \$STR \$MUT
 *SHE: Let's just finish this sentence real quick.
 %tfc: \$COM \$MEC
 %ssc: \$MUT \$DIR:sof
 *EME: It is.
 %ssc: \$COT
 *SHE: It is?
 %ssc: \$CLA
 *EME: Yeah.
 %ssc: \$AFF
 *SHE: Ok, we're done.
 %tfc: \$STR
 %ssc: \$MUT
 *SHE: Wait.
 %ssc: \$DIR
 *EME: No, don't change it.
 %tfc: \$COM
 %ssc: \$DIS \$DIR
 *SHE: Ok, Emmy. Let's read it over.
 %cpc: \$REA
 %ssc: \$MUT \$DIR:sof \$NAM
 *EME: We did.
 %ssc: \$INF \$MUT
 *SHE: I think this needs to be changed.
 %tfc: \$COM
 %ssc: \$INP
 *EME: Nah@.
 %ssc: \$DIS
 *SHE: Maybe?
 %ssc: \$ELI
 *EME: No it's good.
 %ssc: \$DIS \$PEV
 *EME: Come on.
 %ssc: \$DIR
 *SHE: And me Shemeeka?
 %ssc: \$NAM \$CLA
 *EME: Yep.
 %ssc: \$AFF
 @End

^Z